



Dart Aerospace Ltd.
1270 Aberdeen St
Hawkesbury, ON
K6A 1K7
Canada

Tel (613) 632-5200
Fax 613 632-5246

6

D212-664-201TRN
Job Sheet 183778



Part No: D212-664-201TRN

Job Qty: 1 ea

Part Name: Crosstube Turning Detail



Part Weight: 0 lbs

Status: Scheduled

Priority: Medium

Job Created: 9/26/18

Job Tracking No:

Due Date: 10/12/18

Created By: Marie Lajeunesse

Type: Stock

Description:

Note: D212-664-241 REV E IPP Rev:A 08-03-06 new issue DD verified by:ec IPP Rev B 08.04.02 Removed polish EC verified DD

Ship Via:

Bill of Materials

Job Routing

Op No	Operation	Qty	Start Date	Due Date	Standard		Workcenter/Supplier		Sign-off
					Setup hrs	Run Hrs	Workcenter / Supplier	Lead Time	
90	Start up Operation	1 Ea		10/12/18	0.00	0.00	Start Up Crosstubes-2		MD
100	Mori Seiki	1 pcs		10/12/18	0.00	1.33	Mori Seiki TL-40		MD
110	QC	1 pcs		10/12/18	0.00	0.00	QC2 Machining-5		MD
120	Mori Seiki	1 pcs		10/12/18	0.00	1.33	Mori Seiki TL-40		MD
130	QC	1 pcs		10/12/18	0.00	0.00	QC2 Machining-5		MD
140	QC	1 pcs		10/12/18	0.00	0.00	QC8		MD
145	Crosstubes	1 pcs		10/12/18	0.00	0.25	Crosstubes-2		MD
150	HandFXtube	1 pcs		10/12/18	0.00	0.25	Crosstubes-3		MD
160	QC	1 pcs		10/12/18	0.00	0.00	QC7-1		MD
170	Packaging	1 pcs		10/12/18	0.00	0.00	Packaging3-1		MD
180	QC21-SA	1 Ea		10/12/18	0.00	0.00	QC21		MD

Part Op 100 - 1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA114 2-Turn first side as per Folio FA114
Descriptions: 120 - 1-Turn second side as per Folio FA114

145 - GRIND ONLY TRANSITION LINES SMOOTH LONGITUDE WAY.

150 - 1- handfinish X-TUBE INSIDE AND OUT

170 - Identify and stock in kanban rack Location: _____

Job BOM

Part / Item	Component Name	Quantity	Operation	Container
D6006-129	Crosstube Material	1 Ea (1 ea)	90-Start up Operation	

3123969

Job Allocations

Operation	Component Part	Required	Inventory	Allocated
90-Start up Operation	D6006-129	1	65	0

Part Specifications

Specifications could not be found.

DQA: _____ Date: _____

WORK ORDER NON-CONFORMANCE / UPDATE



QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____	DISPOSITION ☐ Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved
Part No. _____	
NCR No. _____	

Date : _____	Step #: _____
--------------	---------------

Description Work Order Deviation

DART
AEROSPACE

Container No: S123084

Part: D212 - 664 - 201TRN

Job No: 183778

Serial No/Batch: S123084

Revision: E

Inspector: _____

Exp Date: _____

Instructions: _____

1270 Aberdeen Street
Newkensbury, ON K6A 1K7
CANADA
TEL.: 1 613 632 - 5200
Email: sales@dartaero.com
www.dartaerospace.com

Date: 10/31/18

Root Cause			FAULT CATEGORY		
☐ Environment	☐ No Re-verification	☐ Pressure/Forced	☐ Temperature/Cure	☐ Power Loss/Surge	☐ Positioned Wrong
☐ Design	☐ Operator	☐ Bending	☐ Set-up	☐ Folio/Program	☐ Outside Dimensions
☐ Doc/Data	☐ Offset/Setup	☐ Centre Not Concentric	☐ BOM/Route	☐ Grain	☐ Over/Under tolerance
☐ Equip/Tooling	☐ Supplier	☐ Cracks	☐ Broken/Damage/Defect	☐ Weld	☐ Part Incorrect
☐ Handling/Pre	☐ Training	☐ Crimp/Kink/Ripple/Wave	☐ Inspection Incomplete/Unqualified	☐ Wrong Stock Pulled	☐ Part Lost/Missing
☐ Material	☐ Use for Testing	☐ Cuffs	☐ Contamination	☐ Out of Sequence	☐ Part Moved
☐ Internal Transport	☐ Poor Information	☐ Crushing	☐ Countersink	☐ Off-set	☐ Drawing
☐ Tribal Knowledge	☐ Rushing	☐ Heat Treat	☐ Cut Too Short	☐ Mislabeled	☐ Finish
☐ LOA	☐ Product Improvement	☐ Wave/Twist in Tube	☐ Instructions Incomplete/Unclear	☐ Fit/Function	☐ Misread
☐ Substation	☐ Process Improvement	☐ Marks/Chatter	☐ Drill Holes	☐ Misaligned/off center	☐ Turning Sequence
☐ Past Expiry Date	☐ Manufacturing Process	OTHER : _____			
☐ Misidentified	☐ Past Due				

⑥

DART AEROSPACE LTD	Work Order:	183778
Description: Crosstube Assembly (205/212 High Aft)	Part Number:	D212-664-241
Inspection Dwg: D212-664-241 Rev: E		Page 1 of 2

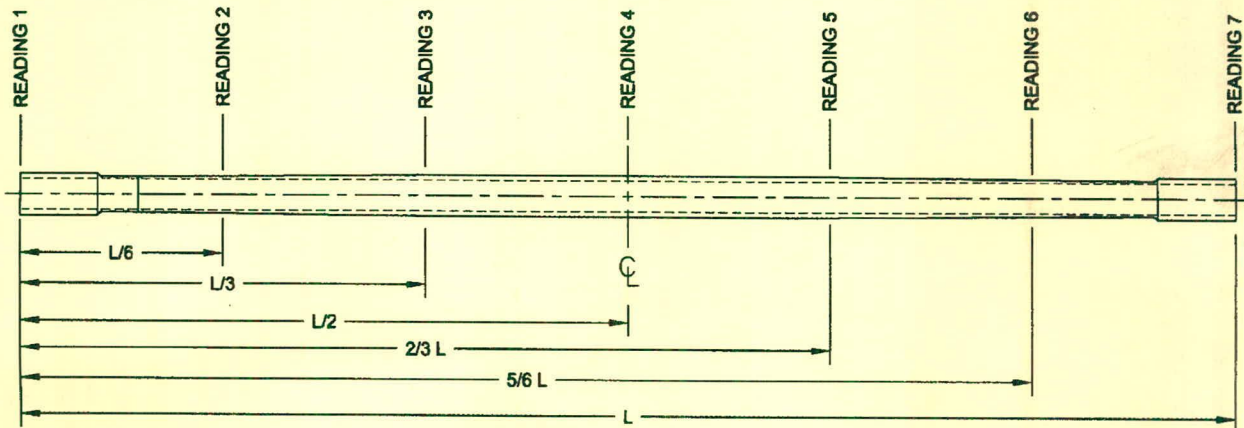
FIRST ARTICLE INSPECTION CHECKLIST

Inspection Sheet Drawing Dimension		Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	0.200	+/-0.010	.203	✓		CNC-08	
	R0.063	+/-0.010	.063	✓		RG	
	2.990	+0.005/-0.000	2.994	✓		CNC-04	
	5.237	+/-0.030	5.239	✓		CNC-08	
	2.600	+0.005/-0.000	2.605	✓		CNC-04	
	2.686	+0.005/-0.000	2.691	✓		↓	
	2.770	+0.005/-0.000	2.775	✓			
	2.854	+0.005/-0.000	2.859	✓			
	2.938	+0.005/-0.000	2.943	✓			
	3.021	+0.005/-0.000	3.025	✓		CNC-05	
	3.133	+0.005/-0.000	3.138	✓		"	
	3.179	+0.005/-0.000	3.184	✓		"	
SIDE B	0.200	+/-0.010	.201	✓		CNC-08	
	R0.063	+/-0.010	.063	✓		RG	
	2.990	+0.005/-0.000	2.995	✓		CNC-04	
	5.237	+/-0.030	5.237	✓		CNC-08	
	2.600	+0.005/-0.000	2.605	✓		CNC-04	
	2.686	+0.005/-0.000	2.691	✓		↓	
	2.770	+0.005/-0.000	2.775	✓			
	2.854	+0.005/-0.000	2.859	✓			
	2.938	+0.005/-0.000	2.943	✓			
	3.021	+0.005/-0.000	3.026	✓		CNC-05	
	3.133	+0.005/-0.000	3.138	✓		"	
	3.179	+0.005/-0.000	3.184	✓		"	
	124.362	+/-0.020	124.360	✓		Tape	

6

DART AEROSPACE LTD	Work Order:	183778
Description: Crosstube Assembly (205/212 High Aft)	Part Number:	D212-664-241
Inspection Dwg: D212-664-241 Rev: E		Page 2 of 2

WALL THICKNESS MEASUREMENT



Location	WALL THICKNESS MEASUREMENT (IN)				Deviation Δw (max-min)	TOLERANCE
	w1	w2	w3	w4		
READING 1 L= 0"	.381	.409	.415	.393	.034	0.062"
READING 2 L= 20.73	.331	.330	.301	.294	.037	
READING 3 L= 41.45	.492	.497	.485	.478	.019	
READING 4 L= 62.18	.524	.529	.524	.516	.013	
READING 5 L= 82.91	.485	.489	.495	.489	.010	
READING 6 L= 103.64	.311	.315	.318	.312	.007	
READING 7 L= 124.36	.379	.403	.408	.392	.029	

Calibration Result

Actual Block Thickness: 200-500

Sitescan 250 Measured Thickness: 200-500

Measured by:	MD
Date:	2018/10/31

Audited by:	
Date:	

Preliminary Approval:	
Date:	

Rev	Date	Change	Revised by	Approved
A	05.04.27	New Issue (P/O D412-664-201)	KJ/JLM	
B	06.03.09	Tolerance for 5.237 was +/-0.001	KJ/JLM	
C	07.05.08	Dwg Rev. updated	KJ/JLM	
D	10.08.03	Dimension 124.362 was 124.36	KJ	
E	12.06.04	Wall thickness form added	KJ	
F	15.03.03	Dwg Rev updated	KJ	

Item	Qty -241	Qty -241B	Part Number	Description
1	X		D212-664-241	CROSSTUBE ASSEMBLY (205/212 HIGH AFT)
2		X	D212-664-241B	CROSSTUBE ASSEMBLY (214 HIGH AFT)
3	1	1	D6006-129	CROSSTUBE
4	2		D2940-1	SUPPORT
5	4	4	D3595-063-530	RUBBER CUSHION
6		2	D5018-1	SUPPORT
7	4	4	MS21920-28	CLAMP (OR MS21920-30)
8	A/R	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

GENERAL NOTES:

- MATERIAL: MANUFACTURED FROM D6006-129
FINISHED LENGTH = 124.362±0.020
- FINISH: a) CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
b) PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
c) MASK UNDERSIDE OF CROSSTUBE AS SHOWN (ZN C8-2 / C8-3, HATCHED AREA)
d) PAINT OUTSIDE PER DART QSI 005 4.2
e) REMOVE MASKING AND APPLY MATTE CLEAR COAT
- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- UNITS: INCHES UNLESS OTHERWISE NOTED.
- BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- WEIGHT: D212-664-241/-241B = 44.2 lbs
- PART IS SYMMETRIC ABOUT CENTERLINE.
- EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

MACHINING

- RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.

BENDING

- BEND PROGRESSIVELY WITH A MINIMUM OF 5 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 7.2% (BASED ON O.D.) IN LOWER HALF OF R35.5 BEND AND 6% (BASED ON O.D.) ON REMAINING TUBE.
- LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.

ASSEMBLY

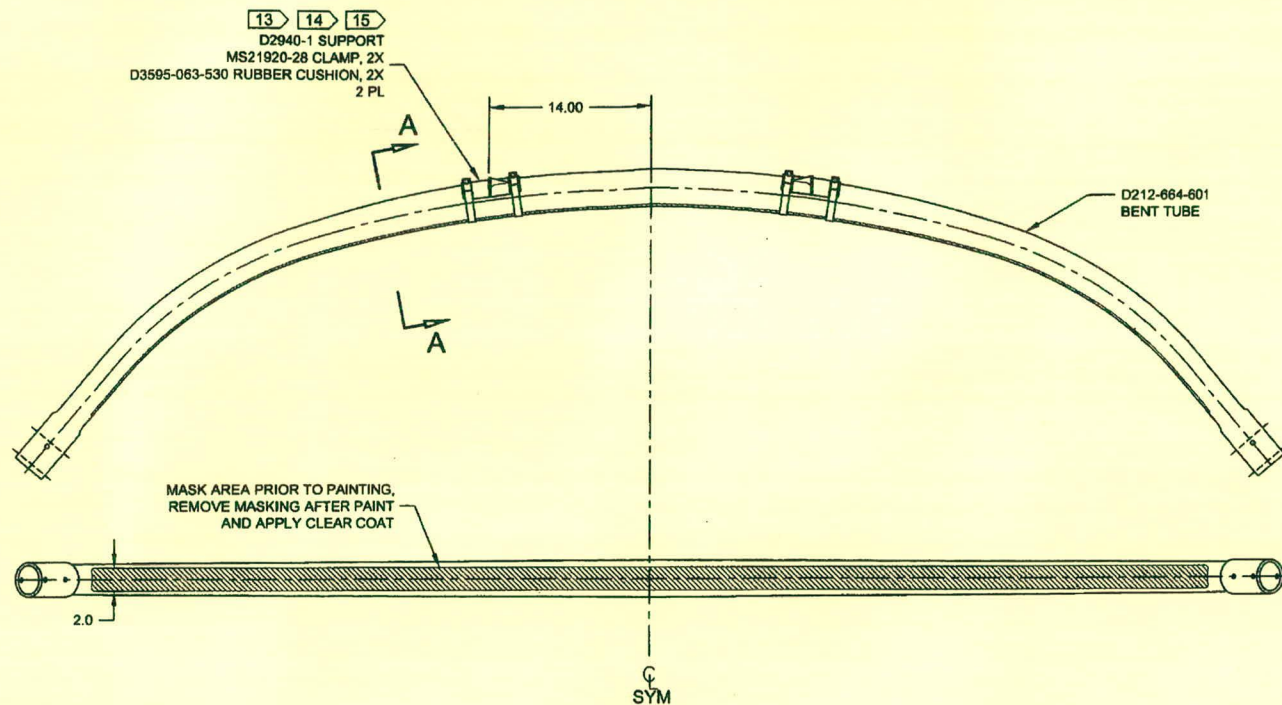
- INSTALL D2940-1 / D5018-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- INSTALL MS21920-28 CLAMPS (OR -30) WITH D3595-063-530 RUBBER CUSHIONS TO SECURE THE SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE ON TOP SIDE OF CROSSTUBE.
- TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 183778 MCT
18-09-26

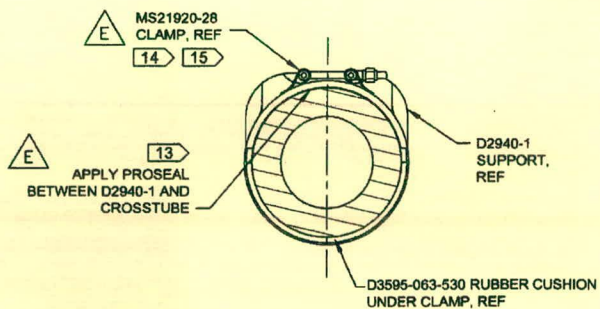
RELEASED
2014-05-26
ND

E	D5018-1 WAS D2940-1 (-241B), PROSEAL WAS MAGNOBOND, NOTE 2: ADD INSPECTION WINDOW, NOTE 11: ALLOW 7.2% CRUSH, NOTE 15: ADD 72HR CURE AND RETORQUE FOR PROSEAL, ADD SHEET 3, CLAMPS REVERSED TO PREVENT CHAFING (ZN B7-2, B7-3), BEND HEIGHT TOL. NOW 0.25 WAS 0.13 (C1-4), INCORP DEO D-1-2	CP	14.04.01
D	REFORMAT/REVISE GENERAL NOTES/PART LIST; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; ADD -241B (ZN D4-2, B4-2); REMOVED REF & ADD TOLERANCES (ZN D8-3 & C4-3, C8-3 & A8-3); RELOCATED FLAG #6 PER PAR 08-048 (ZN A5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4	RF	09.09.30
C	REMOVE -1008 ABRASION STRIP; ADD MAGNOBOND 8398, CUSHION, REVERSE CLAMPS	PH	07.03.08
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	CP	00.12.12
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	14.04.01		

DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWING NO. D212-664-241	REV. E SHEET 1 OF 5
TITLE CROSSTUBE ASS'Y (205/212 HI AFT)	SCALE NTS
COPYRIGHT © 2000 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	



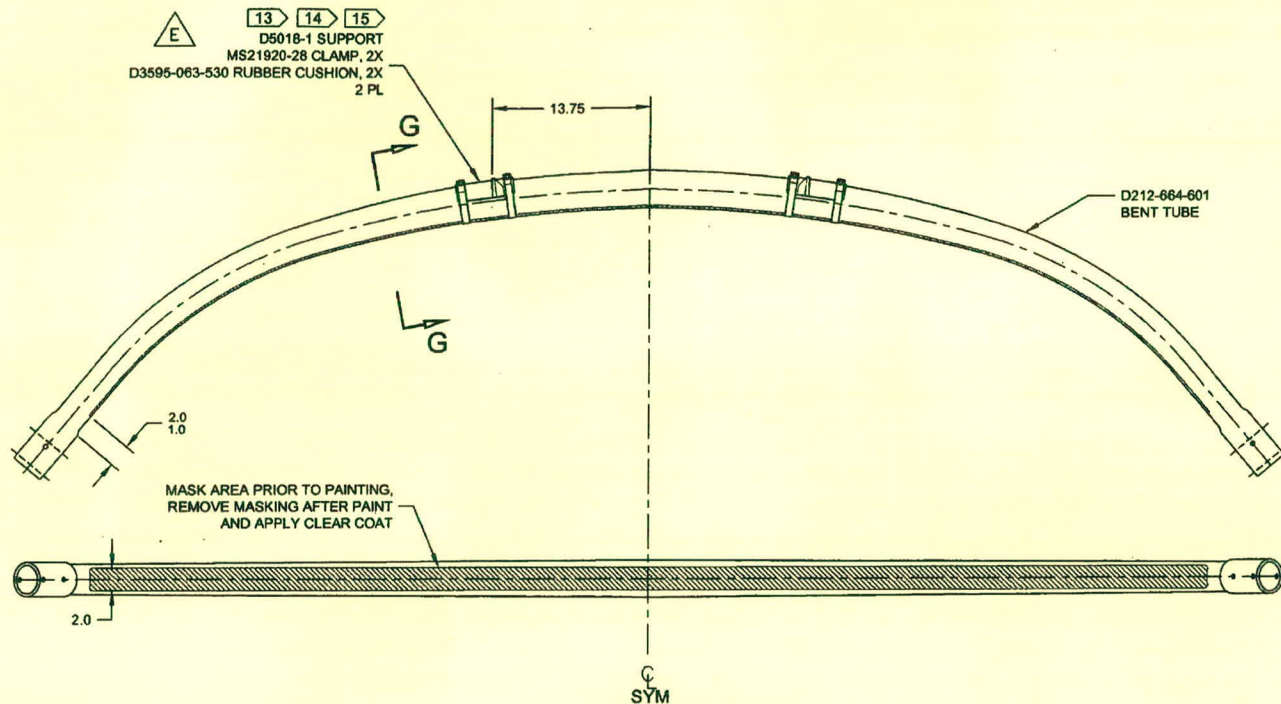
**D212-664-241
ASSEMBLY DETAIL**



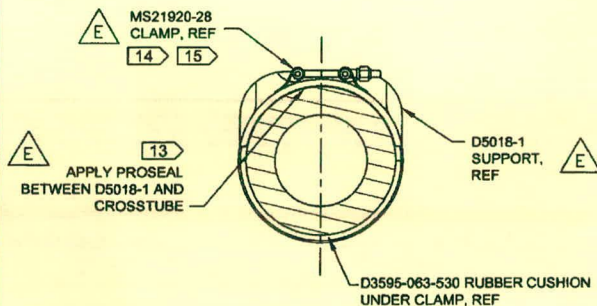
**SECTION A-A
SCALE 4X**

RELEASED
2014-05-26

DESIGN	9	DART AEROSPACE LTD	
DRAWN	9	HAWKESBURY, ONTARIO, CANADA	
CHECKED	SL	DRAWING NO.	REV. E
MFG. APPR.	NO	D212-664-241	SHEET 2 OF 5
APPROVED	NO	TITLE	SCALE
DE APPR.	H	CROSSTUBE ASS'Y (205/212 HI AFT)	NTS
DATE	14.04.01	COPYRIGHT © 2000 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL, AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	



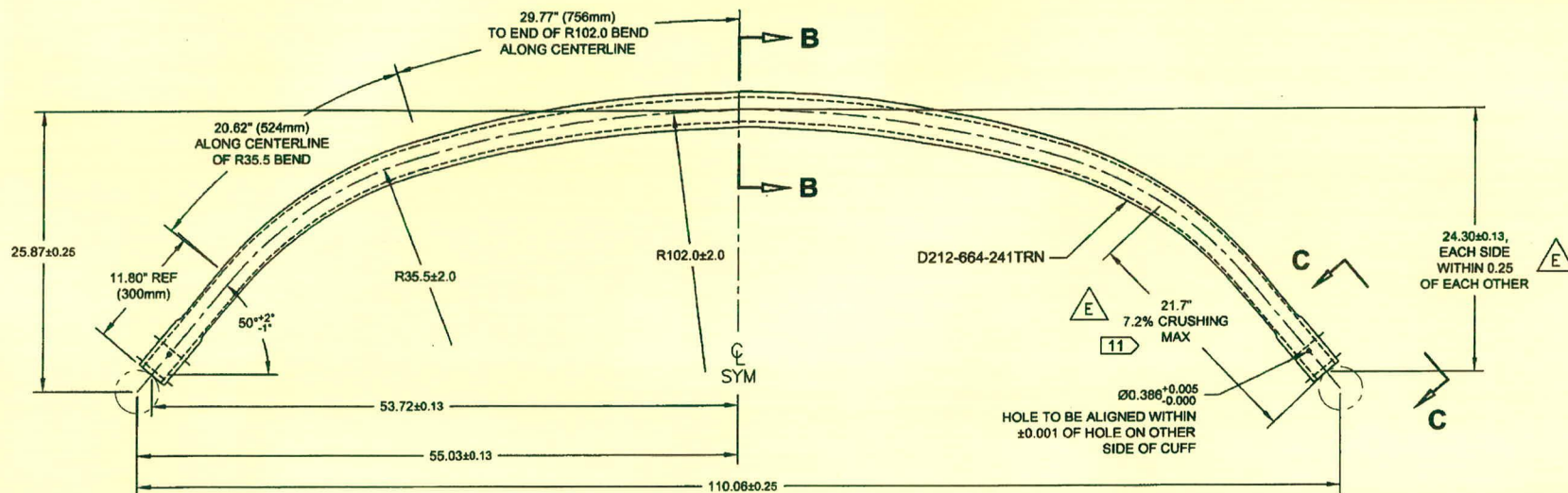
**D212-664-241B
 ASSEMBLY DETAIL**



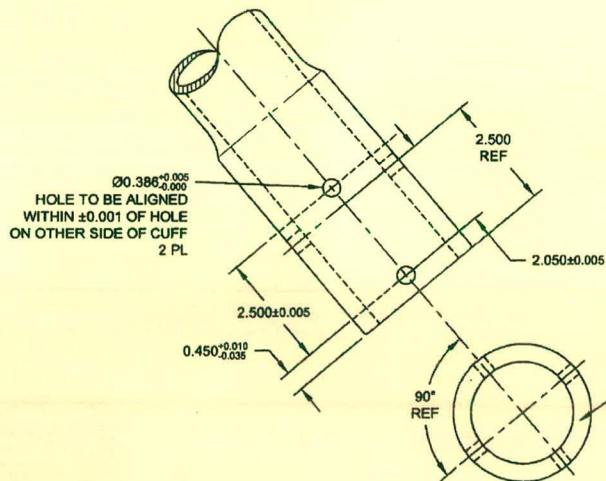
**SECTION G-G
 SCALE 4X**

RELEASED
 2014-05-26

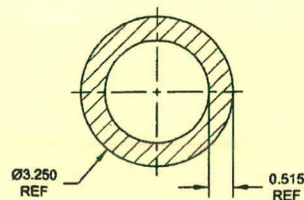
DESIGN		DART AEROSPACE LTD	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. E
MFG. APPR.		D212-664-241	SHEET 3 OF 5
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASS'Y (205/212 HI AFT)	NTS
DATE	14.04.01	COPYRIGHT © 2000 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	



D212-664-601 11
BENDING AND DRILLING DETAIL



VIEW C-C: CUFF DETAIL
 SCALE 3X



SECTION B-B
 SCALE 4X

RELEASED
 2014-05-26
WMD

DESIGN	<i>92</i>	DART AEROSPACE LTD	
DRAWN	<i>92</i>	HAWKESBURY, ONTARIO, CANADA	
CHECKED	<i>DL</i>	DRAWING NO. D212-664-241	REV. E
MFG. APPR.	<i>10/</i>		SHEET 4 OF 5
APPROVED	<i>10/</i>	TITLE	SCALE
DE APPR.	<i>10/</i>	CROSSTUBE ASS'Y (205/212 HI AFT)	NTS
DATE	14.04.01	COPYRIGHT © 2005 BY DART AEROSPACE LTD THIS DOCUMENT IS PROPRIETARY AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR REPRODUCED IN ANY MANNER WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD	

